EDITOR'S NOTE

THE FOLLOWING PAGES WERE POOR HARD COPY AT THE TIME OF FILMING. IF AND WHEN A BETTER COPY CAN BE OBTAINED, A NEW FICHE WILL BE ISSUED.

Supreme Court, U.S.
FILED
SEP 22 1987
JOSEPH F. SPANIOL, JR.
CLERK

87 489

No.

In the Supreme Court

OF THE

United States

OCTOBER TERM, 1986

COHERENT, INC.,
Petitioner,

vs.

SPECTRA-PHYSICS, INC.,
Respondents.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

KARL A. LIMBACH
LIMBACH, LIMBACH & SUTTON
2001 Ferry Building
San Francisco, CA 94111
Telephone: (415) 433-4150
Attorneys for Petitioner

BOWNE OF SAN FRANCISCO, INC. • 190 NINTH ST. • S.F., CA 94103 • (415) 864-2300

5508

QUESTION PRESENTED

Did the Court of Appeals for the Federal Circuit engage in improper appellate fact finding when it inferred that the inventors had concealed the best mode of their inventions in the face of contrary findings of fact by the District Court?

TABLE OF CONTENTS

	Page
Question presented	i
Petition for Writ of Certiorari to the Court of Appeals for the Federal Circuit	1
Opinions below	1
Jurisdiction	1
Statute involved	2
Statement of the case	2
Reasons for granting Review	5
Conclusion	7
Appendix A—Court of Appeals decision of 8-17-87	A-1
Appendix B—District Court Findings & Conclusions 8-28-85	A-24
Appendix C—District Court Memorandum of 12-12-85	A-34
Appendix D—District Court Judgment of 12-16-85	A-36
Appendix E—Verdict of the Jury of 3-8-85	A-38

TABLE OF AUTHORITIES

	Page
Dennison Manufacturing Company v. Panduit Corp., 106 S. Ct. 1578 (1986)	7
In Re Sherwood, 613 F.2d 809, 816 (CCPA, 1980), *cert. denied,* 450 U.S. 994 (1981)	5
28 U.S.C. § 1254(1)	1
35 U.S.C. § 112	2

No.

In the Supreme Court

OF THE

United States

OCTOBER TERM, 1986

COHERENT, INC.,
Petitioner,

vs.

SPECTRA-PHYSICS, INC.,
Respondents.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Coherent, Inc. petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Federal Circuit in this case.

OPINIONS BELOW

The opinion of the Court of Appeals for the Federal Circuit, Appendix A, was designated for publication, but has not been reported at this time, and the opinion of the District Court for the Northern District of California, Appendix B, is not reported.

JURISDICTION

The judgment of the Court of Appeals was entered August 17, 1987. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

STATUTE INVOLVED

Section 112 of Title 35 U.S.C. provides in pertinent part:

"The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, *and shall set forth the best mode contemplated by the inventor of carrying out his invention.*" (Emphasis added)

STATEMENT OF THE CASE

This is a patent infringement case between the two largest manufacturers of commercial lasers in the world in which petitioner Coherent Inc. charged patent infringement against respondent Spectra-Physics Inc., which is a subsidiary of Ciba-Gieigy Limited of Basle, Switzerland.

Dr. Hobart and Mr. Mefferd invented a new laser. Parts of the laser were connected by brazing which was an old and well known technique. They applied for patents and they disclosed in the patents two ways of performing the brazing, one way known as Moly-manganese and the other known as TiCuSil. They also disclosed in their patents that they preferred the TiCuSil alternative, but without any intent to conceal information, they did not disclose the details of how either the Moly-manganese or TiCuSil brazing technique was performed.

The level of detail of this disclosure was consistent with the practice in the laser art, since many earlier laser patents disclosed that brazing was used to connect parts, but details of the brazing techniques were not disclosed.

The new laser was marketed by Coherent, Inc., the employer of Hobart and Mefferd, and the laser was an important development, so important that the Chairman of the Board of Spectra-Physics described it to his Board of Directors as "a devastatingly competitive new product." Spectra-Physics copied the new laser, and Coherent charged Spectra-Physics with patent infringement.

Spectra-Physics presented many defenses, all of which it has lost, except for one. The jury and the District Judge rejected Spectra-Physics' defenses that (1) the inventions were old in the art, (2) the inventions were obvious, (3) Spectra-Physics had made the inventions first, (4) Hobart & Mefferd had derived the inventions from Spectra-Physics, (5) Coherent had failed to join a co-inventor, Dr. Rempel, and (6) Coherent had concealed the best mode of the invention.

The District Judge held that Spectra-Physics had sustained one defense, namely that Coherent had failed to disclose in the patent an enabling disclosure of the inventions. This defense, however, was rejected by the Court of Appeals as a matter of law, because the Moly-manganese technique of brazing disclosed in the patent and used by Spectra-Physics was so well known in the art that the details of the technique did not need to be disclosed. Thus, while the patent did not disclose the details of either the Moly-manganese or TiCuSil brazing techniques, as was the custom in laser patents, the fact that the Moly-manganese technique was so well known made the disclosure sufficiently detailed to enable one skilled in the art to make and use the invention as Spectra-Physics had demonstrated.

While the Court of Appeals for the Federal Circuit reversed the District Judge on the enablement issue it has held the patents invalid on the ground that the patents did not disclose enough detail about the preferred way that Coherent performed brazing, the TiCuSil way. The Court of Appeals held that the quality of the disclosure of the TiCuSil technique was so poor as to infer concealment.

In reaching this decision, the Court of Appeals for the Federal Circuit substituted its own finding on the "best mode" issue for the findings of fact by the District Judge, and even worse, the Court of Appeals found "concealment" by drawing an inference of concealment in the face of express findings of fact by the District Judge that there was no concealment. The District Judge made the following findings of fact:

> "4. The evidence does not preponderate in favor of the contention that Mefferd intentionally or accidentally con-

cealed the braze technique as the best mode of attaching the heat web to the alumina tube." and

"8. The evidence does not preponderate in favor of the contention that Hobart deliberately or accidentally concealed the braze technique as the best mode of attaching the heat web to the alumina tube."

The Court of Appeals for the Federal Circuit avoided these express findings inferring concealment from its own independent judgment of the quality of the disclosure. The Court of Appeals explained that it could infer concealment as follows, "Even though there may be a general reference to the best mode, the quality of the disclosure may be so poor as to *effectively result in concealment*." (emphasis added)[1]

The Court of Appeals attempted to rely on other findings of the District Court to find that the quality of the disclosure was so poor as to effectively result in concealment, but none of these other findings relied on by the Court of Appeals find or even discuss concealment.

The Court of Appeals attempted to dismiss the express findings quoted above by saying that, the district court focused only on the generic rather than the specific information known to the inventors, but the fact remains that the District Court made express findings that there was no concealment, and those findings support the good faith of the disclosure by the inventors in a way that cannot be set aside by any inference the Court of Appeals draws.

---

[1] Not only did the Court of Appeals substitute its own finding for the findings of fact of the District Judge, but also the appellate court ignored the findings of the jury. By finding infringement, the jury expressed its finding that the best mode was disclosed, and the Jury had actually made an express finding that the best mode had been disclosed which is apparent from the original copy of the jury verdict. The jury answered a special interrogatory,

"14. Did Coherent disclose the best mode known to it at the time the patent application was filed? Yes ✓ No ___"

Then the jury masked the answer with "white-out" because the introduction to the interrogatory did not require that an answer be given.

Concealment involves much more than the simple issues of what did the inventors know, and what did they disclose that the Court of Appeals examined to draw its inference. Concealment also involves (1) the question of what information that the inventors knew did they recognized as being sufficiently unique or important that it was part of a "best mode" and (2) the question of what overt action was taken for the purpose of concealment.

The District Judge had many items of evidence on which to base its findings, and the Court of Appeals gave no reason why the District Judge should have rejected this evidence. (1) It was a de facto practice in the laser art that the details of brazing processes were omitted from patents. Ex5016, ExO, Ex4004, Ex5011 (2) The Hobart and Mefferd patents identified the company from which the TiCuSil brazing material could be purchased, and both Coherent and Spectra-Physics purchased the TiCuSil from that supplier. T17-2285A (3) The supplier of TiCuSil made available to customers information on how to use TiCuSil. T22-3080 & T19-2621 (4) How to use TiCuSil was described in a text book which both the Coherent and Spectra-Physics engineers used. T17-2367-8 & T21-3040-3 (5) Most important of all, the District Judge saw the live testimony of the inventors, and only he and the jury could decide if Mr. Mefferd or Dr. Hobart concealed anything.

REASONS FOR GRANTING REVIEW

The essential element which must be proven to sustain the defense that the best mode has not been disclosed is concealment by the inventor. *See: In Re Sherwood,* 613 F.2d 809, 816 (CCPA, 1980), *cert. denied,* 450 U.S. 994 (1981) where the court said, "The board correctly recognized that there is no objective standard by which to judge the adequacy of a best mode disclosure. (citing) Instead, only evidence of concealment (accidental or intentional) is to be considered."

The Court of Appeals for the Federal Circuit should be reversed for appellate fact-finding, because it substituted its inference of concealment for an express finding to the contrary by the proper finder of fact.

More importantly, Certiorari should be granted because the decision of the Federal Circuit held invalid extremely important patents in litigation between the two largest commercial laser manufacturers in the world, and the grounds for the decision are hypertechnical at best. Such a decision has a chilling effect on the patent system which is so important to the high technology segment of our American economy. American business men cannot be expected to rely on our patent system when their good faith efforts to develop and protect valuable inventions are struck down in cases like this.

Dr. Hobart and Mr. Mefferd had done exactly what the patent statute required. They had disclosed enough detail about their inventions for a competitor to make and use the inventions, and they had identified which of the alternative ways they preferred. The disclosure was consistent with the de facto standard for disclosures in laser patents. What is a business man to conclude when he is denied patent protection under these circumstances where his invention is "a devastatingly competitive new product", new, non-obvious, and disclosed in his patent in sufficient detail for his competitors to copy it?

CONCLUSION

The Court of Appeals for the Federal Circuit substituted its inference for the findings of the District Court, a practice which has become a problem with the Federal Circuit, *Dennison Manufacturing Company v. Panduit Corp.*, 106 S. Ct. 1578 (1986). The Federal Circuit may be a super circuit in the sense that it is supposed to be the sole oracle on issues of patent law, but it is not a super court to the extent that it should second guess trial courts on the factual issues of patent cases. This Court should grant certiorari to exercise its supervisory authority to curtail this practice.

Respectfully Submitted,

KARL A. LIMBACH
LIMBACH, LIMBACH & SUTTON
2001 Ferry Building
San Francisco, Ca. 94111
Telephone: (414) 433-4150
Attorneys for Petitioner

September 18, 1987

(Appendix follows)

Appendix A

United States Court of Appeals
for the Federal Circuit

Appeal Nos. 86-1114, and 86-1133.

Spectra-Physics, Inc.,
Appellee/Cross-Appellant,

v.

Coherent, Inc.,
Appellant/Cross-Appellee.

Decided: August 17, 1987

Before Rich, *Circuit Judge*, Skelton, *Senior Circuit Judge*, and Archer, *Circuit Judge*.

Rich, *Circuit Judge*.

These are cross-appeals from the December 16, 1985, judgment of the United States District Court for the Northern District of California holding both of Coherent's patents in suit, No. 4,378,600 entitled "Gas Laser" issued on March 29, 1983, to James L. Hobart (the Hobart patent) and No. 4,376,328 entitled "Method of Constructing Gaeous Laser" issued on March 15, 1983, to Wayne S. Mefferd (the Mefferd patent), invalid for lack of enabling disclosure under 35 USC 112, first paragraph, after originally entering judgment on a jury verdict finding claims 2, 5, 7, and 18 of the Hobart patent and claim 10 of the Mefferd patent valid and infringed by Spectra-Physics, Inc. (Spectra).

We reverse the district court's holding that both patents are invalid for lack of enablement. We also reverse, however, the court's finding that both patent specifications complied with the best mode requirement of § 112, and thus affirm the judgment that the patents are invalid, but on a different legal ground.

Before discussing the legal aspects of this case, we first explain the technology involved which gave rise to them.

Background

A. Ion Lasers—In General

The Hobart patent is directed to an ion laser structure and the Mefferd patent to a method of fabricating an ion laser. "Laser" is an acronym for Light Amplification by Stimulated Emission of Radiation.[1] An ion laser is a type of gaseous laser. The lasing medium, typically argon or krypton gas, is contained within a sealed discharge tube which is axially aligned with a pair of mirrors to form the optical cavity or resonator.

For lasing to take place, the argon or krypton gas must be excited to elevated energy states. This is accomplished by providing a high-energy electrical discharge through the gas. The discharge through the laser must then be constrained to a straight line along the laser's optical path and pinched to a small diameter to concentrate its energy into a small elongated volume.

The discharge through the laser is extremely hot—up to 6000°C. The exterior of the laser, however, must operate at room temperature, requiring dissipation of large amounts of heat by external cooling. It is also important that gas pressure be uniformly controlled along the discharge tube. For some reason, not entirely agreed upon by physicists, the gas tends to move to one end of the tube or the other. This phenomenon, known as "pumping," causes an uneven gas pressure differential in the discharge tube, resulting in poor performance or no performance at all.

---

[1] Webster's Unabridged Third New International Dictionary, which further defined laser as "a device that utilizes the natural oscillations of atoms for amplifying or generating electromagnetic waves in the region of the spectrum from the ultraviolet to the far-infrared including the visible region."

B. Hobart

The Hobart patent is directed to a gas laser having an improved laser discharge tube.[2] The discharge path of the laser is determined by coaxially aligned apertures in a series of spaced-apart tungsten discs within the laser discharge tube. The discharge tube itself is a thin-walled ceramic tube, for example, of alumina (Al_2O_3). Heat from the tungsten discs is transmitted by conduction to and through the ceramic tube (26), which is surrounded by a water jacket, by copper cups (50) attached to the inside of the tube. See Fig. 1 below, which is a dissected sectional view showing two end portions with a substantial portion of the central section omitted, the broken line representing the longitudinal axis.

---

[2] Claim 1 of the Hobart patent reads:

1. A laser comprising:

a gas-confining cylindrical tube made of a relatively thin-walled, electrically-insulating material;

a plurality of spaced-apart discs within and generally perpendicular to the axis of said tube, each having a central aperture co-axially aligned with the axis of said tube to define a central discharge path;

a plurality of cup-shaped members of a material having high thermal conductivity, each having a generally flat face and a generally cylindrical rim, and each having an opening in the middle of the face;

means for providing a heat conduction path from the central aperture of each of said discs to and through the tube wall comprising means for attaching a disc at the pheriphery [sic, periphery] of the opening of each of the cup members and means for attaching the distal edge of each of the cup rims along the inside wall of said tube;

means for exciting a gas within said tube; and an optical cavity aligned with said tube.

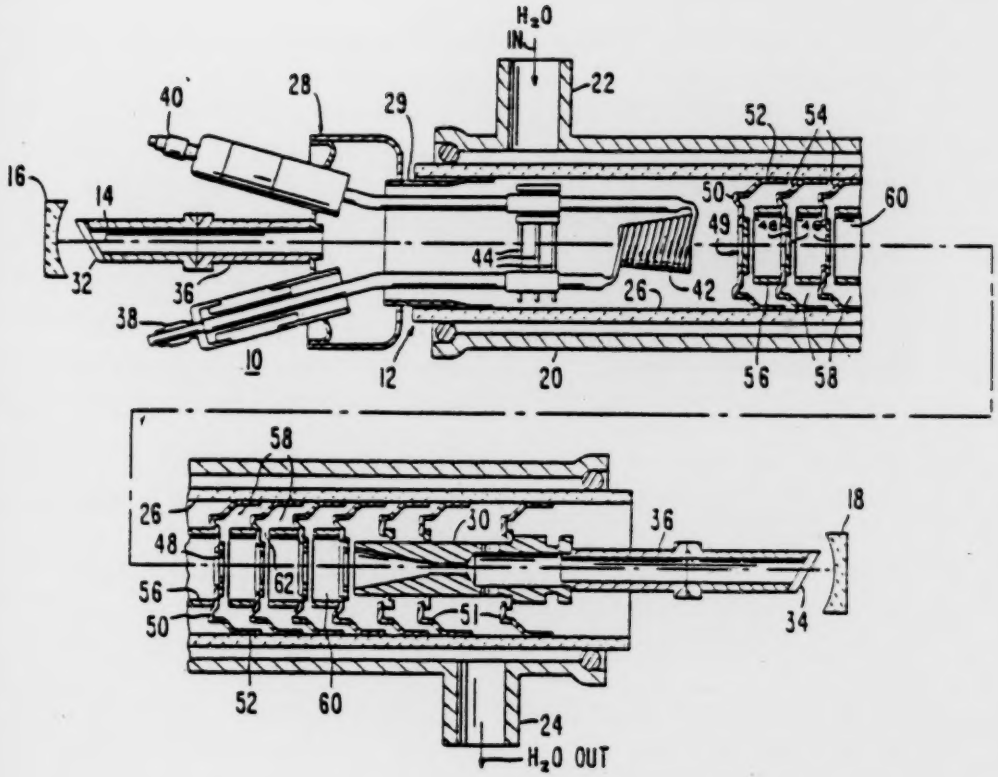

Figure 1.
Cross-sectional View of Laser Structure

Claim 1 calls for "means for providing a heat conduction path from the central aperture of each of said discs to and through the tube wall." This includes both means for attaching the tungsten discs (48) to the center opening of each copper cup and means for attaching the cups to the inside wall of the ceramic tube. High thermal conductivity is achieved by brazing or soldering which provides a permanent metallic contact between the cups and the tube wall.

The Hobart patent further discloses and claims a "shield" feature which is a cylindrical ring coaxially attached to or formed

integrally with each of the copper cups.[3] These shields (56) aid in minimizing gas pumping within the discharge tube.

C. Mefferd

The Mefferd patent describes a method of fabricating the laser structure of the Hobart patent.[4] The problem addressed in the Mefferd patent is how to insert and hold in place the heat conducting cups inside the long, slender tube, while at the same time maintaining the apertured discs in precise alignment. The patent discloses a "floating" disc technique whereby the disc apertures are aligned by tensioning a mandrel that has been passed through each of the disc apertures. Once the disc apertures are aligned, the whole assembly is brazed to permanently bond the parts within and to the tube walls. See Fig. 12 below in which the copper cups are 50, the shields 56, the discs 48, the mandrel 74 and the ceramic tube 26. The figure shows a partial assembly before the brazing of the discs to the cups, which is done in a vertical position with end "B" upward.

---

[3] Claim 2 of the Hobart patent reads:

> 2. A laser as in claim 1 wherein each of said cup-shaped members includes a cylindrical ring gas barrier which is coaxially aligned with the central aperture and which extends within the volume of a cup-shaped member.

[4] Claim 1 of the Mefferd patent reads:

> 1. A method of fabricating a gaseous laser discharge tube comprising:
>
> assemblying [sic] a plurality of spaced-apart head-conducting members, each having a discharge defining central aperture generally aligned with the tube axis, within and in contact with an electrically-insulating tube;
>
> tensioning a mandrel provided through the central aperture to bring the central apertures into exact alignment; and
>
> permanently securing the heat-conducting members to the electrically-insulating tube.

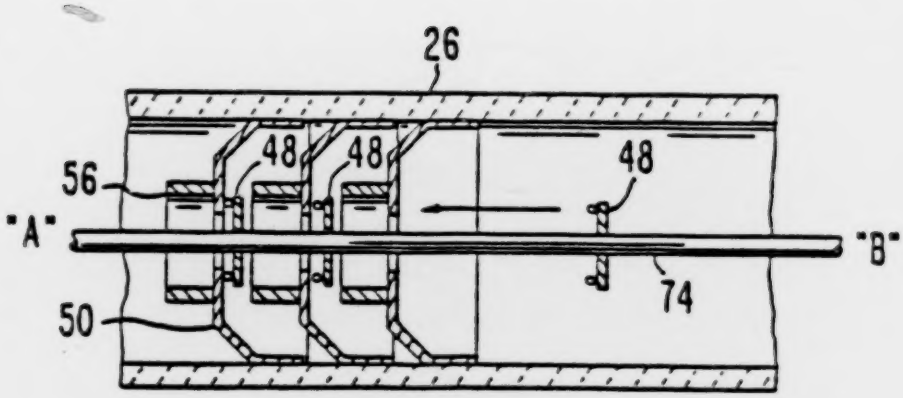

Figure 12.
Cross-sectional View Illustrating Assembly
of Cups and Discs Within Discharge Tube

D. The Importance of Brazing

Both the Hobart and Mefferd patents stress the importance of the bond between the copper cups and the ceramic tube. Poor thermal contact between them results in higher disc temperatures which in turn impedes the gas flow through the tube. For the laser to be reliable, the copper-ceramic bond must also be able to withstand repeated heat cycling. Due to the differing rates of thermal expansion of copper and alumina, the bond is subject to compressive forces as the laser heats up and tensile stress during cooling.

Dr. Hobart initially approached the problem of how to make the critical copper to ceramic bond by experimenting with soldering. These attempts were unsuccessful and no attempt was made to even try to solder together any laser shaped parts. Wayne Mefferd was then brought in to solve the attachment problem. His solution was brazing.

While the patent specifications disclose pulse soldering as one method of attachment, brazing is clearly the preferred method. In this process, a brazing shim 68, Fig. 4, is placed between the copper cup 50 and the inner wall of the ceramic tube 26, Fig. 3, and the whole assembly is heated to the melting point of the braze material.

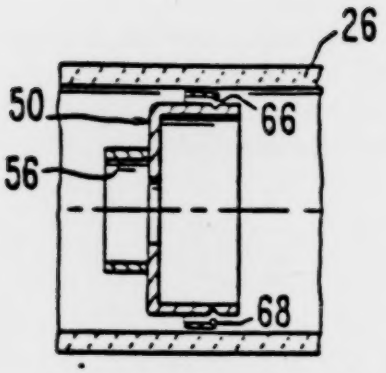

Figure 3.

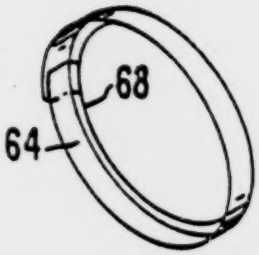

Figure 4.

During heating the cup is mechanically expanded into contact with the tube by means of an expansion tool inserted into tube 26.

The patents further disclose "TiCuSil" as the preferred brazing material. This material is a copper silver eutectic (an alloy whose ingredients are proportioned to have the lowest possible melting point) with a small percentage of titanium added for making a ceramic to metal seal under what is known as the active metal process. In this process, the titanium invades and wets the ceramic so that the copper-silver braze material can hold the copper to the ceramic. In the absence of an active metal alloy component such as titanium, the ceramic must be premetalized with, for example, moly-manganese (MoMn), to provide a metallic surface to which the copper-silver braze material will adhere.

The TiCuSil active metal process is preferred because it requires only one step and avoids the need for premetalization. In addition, the copper cups cannot be electrically connected because this destroys the evenly graduated electrical potential down the bore of the tube which is required for the laser to operate. Thus, any premetalization must be in circular stripes along the inner surface of the tube so that each copper cup can be brazed or soldered to a different stripe.

E. Patentee Coherent's Six-Stage Braze Cycle

According to the standard product specification sheet, TiCuSil should be brazed at 850°C. The sheet also specifies that the braze should be performed in a vacuum or in a neutral atmosphere of

dry argon gas. Using these general guidelines, Mefferd developed a six-stage braze cycle for using TiCuSil to attach the copper cups to the ceramic tube. "Braze cycle" is a term of art which refers to a process defined by specific parameters of temperature, length of times at given temperatures, atmosphere, and pressure.

Mefferd knew that there were tradeoffs in the braze cycle. For one, it is generally desirable to heat the parts as fast as possible. As the parts are heated, however, "outgassing" occurs and contaminants trapped in the parts are released into the atmosphere of the oven. The vacuum pump removes the outgassed contaminants, but if the outgassing is too rapid, then the pressure may rise and the pump will not work. Also, if oxygen is evolved as part of the out-gas, the titanium may react with it and degrade the strength of the braze joint.

In assessing the tradeoffs, Mefferd let the pressure control the braze cycle, as one experimental approach. For example, Mefferd held the pressure in the oven at 10^{-4} torr while the assembly was initially heated from 0 to 750°C. This took from an hour and a half to two hours. In the next step, he held the temperature at 750° for ten to fifteen minutes while further reducing the pressure. The temperfature was then increased for a period of approximately fifteen minutes until it reached 850°C. The remaining steps include holding the temperature at 850°C for a specified time and at a pressure of 10^{-4} torr, decreasing the over temperature to 750°C and adding argon gas, and then turning the oven off.

Mefferd's six-stage cycle produced a reliable braze joint between the copper cups and the ceramic tube. Because this approach worked, Coherent continued to use TiCuSil and never investigated the moly-manganese process or further experimented with soldering. Neither the Hobart patent nor the Mefferd patent, however, discloses the braze cycle or any additional information on brazing copper to ceramic using TiCuSil.

F. Spectra's "Cold Disc" Lasers

Dave Wright, head of research at Spectra, and his technician Martin Riley, worked on so-called "cold disc" lasers of the type in

suit in the late 1970's. They referred to these lasers as "cold disc" lasers because the process of brazing the copper cups to the ceramic tube provided good thermal conduction as contrasted with the earlier radiatively cooled lasers which ran hot. Wright and Riley, however, had only limited success with cold disc lasers, in part because they could not make satisfactory bond between the copper cups and the alumina ceramic tube. Upon repeated heat cycling, the ceramic would crack and cause the copper to break away, overheat, and melt, which destroyed the operation of the tube. After two and a half years, Wright was unable to make a TiCuSil braze joint which was reliable enough for commercially acceptable product and Spectra temporarily abandoned the project.

Spectra resumed work on the cold disc project in 1981 after Coherent introduced its INNOVA laser embodying the inventions of the patents in suit. Because of their uncertainty about brazing, Spectra hired a brazing expert, Dr. Leonard Reed, to develop a moly-manganese process for attaching the cups to the ceramic tube. After nearly a year of experimentation, Dr. Reed developed Spectra's proprietary moly-maganese process. This involved using precision ceramic tubing and a special computerized striping tool which ground circular rings away from a coat of moly-manganese metallization painted on the entire inside of the tube.

Spectra eventually introduced its Model 2020 gas laser which was made using the moly-manganese process. Like Coherent's laser, each of the copper cups in the 2020 laser has a ring or shield to alleviate the gas pumping problem.

The Decision Below

Spectra brought a declaratory judgment action against Coherent asking a holding of invalidity and non-infringement of both patents. Coherent counterclaimed for infringement and an adjudication of validity.

After thirty-two days of trial, the district court submitted eighteen "Interrogatories to the Jury" and the jury answered fifteen of them, finding in part that Spectra's model 2020 laser

infringed claims 2, 5, 7, and 18 of the Hobart patent and claim 10 of the Mefferd patent (the shield claims). The jury found that the remaining claims of both patents were invalid for obviousness or were anticipated by the work done by Wright and Riley at Spectra. The jury also found, however, that Wright and Riley had not reduced their cold disc laser to practice before conception of the subject matter set forth in the Hobart and Mefferd patents.

After entering judgment on the jury verdict, the district court withdrew the judgment and asked the parties to prepare proposed findings of fact and conclusions of law on several additional issues including disclosure of best mode and enablement under § 112, co-inventorship of the shield claims by Dr. Rempel, another Coherent employee, and inequitable conduct. The court ruled in favor of Coherent on all of these issues except enablement. On that issue, the court held both patents invalid for failure to disclose the six-stage braze cycle used by Coherent to manufacture the laser. The court found that the best mode requirement was satisfied, however, because neither Hobart nor Mefferd deliberately or accidentally concealed brazing as the best mode of attaching the copper cups to the ceramic tube.

Coherent appeals from the judgment with respect to lack of enablement and seeks reinstatement of the jury verdict that the shield claims are valid and infringed by Spectra. Coherent also appeals the portion of the judgment finding the remaining (non-shield) claims invalid for obviousness because of an erroneous jury instruction and requests a remand for a new trial on these claims.

Spectra cross-appeals from the judgment as it relates to best mode, inventorship of the shield claims, and derivation of the claimed subject matter from Wright and Riley. Spectra also appeals the denial of its request for attorney fees.

OPINION

1. Introduction—Adequate Disclosure Under § 112, 1st Paragraph

To constitute adequate disclosure under the first paragraph of 35 USC 112, a patent specification must set forth both the manner and process of making and using the invention (the enablement requirement) and the best mode contemplated by the inventor of carrying out the invention (the best mode requirement). The difference between these two is explained in *In re Gay*, 309 F.2d 769, 135 USPQ 311 (CCPA 1962):

> The essence of [the enablement requirement] is that a specification shall disclose an invention in such a manner as will enable one skilled in the art to make and utilize it. *Separate and distinct* from [enablement] is [the best mode requirement], the essence of which requires the inventor to disclose the best mode *contemplated by him*, as of the time he executes the application, of carrying out his invention. Manifestly, the sole purpose of this latter requirement is to restrain inventors from applying for patents while at the same time concealing from the public preferred embodiments of their inventions which they have in fact concieved.
>
> . . . The question of whether an inventor has or has not disclosed what he feels is his best mode is, however, a question separate and distinct from the question of the *sufficiency* of his disclosure to satisfy the requirements of [enablement].

Id. at 772, 135 USPQ at 315 (emphasis in original).

Thus, the compliance with the best mode requirement focuses on a different matter than does compliance with the enablement requirement. Enablement looks to placing the subject matter of the claims generally in the possessison of the public. If, however, the applicant develops specific instrumentalities or techniques which are recognized at the time of filing as the best way of carrying out the invention, then the best mode requirement imposes an obligation to disclose that information to the public as well. *See Flick-Reedy Corp.* v. *Hydro-Line Mfg. Co.*, 351 F.2d

546, 550-51, 146 USPQ 694, 697 (7th Cir. 1965), *cert. denied*, 383 U.S. 958 (1966); *Union Carbide Corp.* v. *Borg. Warner Corp.*, 550 F.2d 355, 361-63, 193 USPQ 1, 6-7 (6th Cir. 1977).

The situation before us is one in which the patent specifications disclose more than one means for making the claimed invention, but do not adequately disclose the best means actually known to the inventors. The district court recognized that the specifications were inadequate under § 112, but incorrectly based its decision on a lack of enablement. As we explain, the problem is really one of best mode, and thus, while we disagree with the district court's views on these issues, the judgment that the patents are both invalid was correct and must be sustained.

2. Enablement

a. The Jury Question

Before addressing the substance of the district court's decision on enablement, we consider the question, raised by Coherent, whether the court was free to decide enablement at all without first considering the jury verdict. While no specific question was submitted to the jury on enablement, the district court instructed the jury that "invalid claims cannot be infringed" and provided general instructions on the law of enablement. Coherent maintains that by finding the shield claims infringed, the jury implicitly decided enablement in its favor, and that the court could not overrule these findings without making the determinations required by JNOV.

The district court, however, did not feel constrained by the jury verdict because it considered the question of enablement to be one of law. The court also viewed the form of the verdict as a special verdict under Rule 49(a), Fed. R. Civ. P., and not as a general verdict.

Although enablement is ultimately a question of law, *see, e.g., Moleculon Reseach Corp. v. CBS, Inc.*, 793 F.2d 1261, 1268, 229 USPQ 805, 810 (Fed. Cir. 1986), *cert. denied*, 107 S. Ct. 875 (1987), this court has recognized that there may be underlying factual issues involved, *see Quaker City Gear Works, Inc. v. Skil Corp.*, 747 F.2d 1446, 1453-54, 223 USPQ 1161, 1166 (Fed. Cir.

1984), *cert. denied*, 471 U.S. 1136 (1985). The court may submit legal issues such as enablement to the jury under Rule 49(a), but if it does, the court may not make subsequent findings which overrule an implicit and inherent finding of the jury. *Id.* Because the district court erred in applying the substantive law of enablement, however, we need not decide whether it also overruled the jury's finding.

b. Enablement By Alternative Means

To be enabling under § 112, a patent specification must disclose sufficient information to enable those skilled in the art to make and use the claimed invention. *See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert. denied*, 107 S. Ct. 1606 (1987). The district court held both of the patents in suit invalid for lack of enablement based on their failure to diclose Coherent's six-stage braze cycle for brazing TiCuSil. The court found that the braze cycle was "necessary to the enjoyment of the invention [sic]."

Coherent's braze cycle, however, is applicable only to TiCuSil brazing, which is just one of the ways to make and use the claimed inventions. The Hobart patent calls for "means for attaching" the copper cups to the inside of the ceramic tube and Mefferd has essentially the same step of "permanently securing" the cups to the tube. The specifications identify as suitable attachment techniques the alternatives of TiCuSil brazing, moly-manganese brazing, and low-temperature pulse-soldering.

If an invention pertains to an art where the results are predictable, e.g., mechanical as opposed to chemical arts, a broad claim can be enabled by disclosure of a single embodiment, *In re Cook*, 439 F.2d 730, 735, 169 USPQ 298, 301 (CCPA 1971); *In re Vickers*, 141 F.2d 522, 527, 61 USPQ 122, 127 (CCPA 1944), and is not invalid for lack of enablement simply because it reads on another embodiment of the invention which is inadequately disclosed, *see Gould v. Mossinghoff*, 711 F.2d 396, 400, 219 USPQ 393, 396 (D.C. Cir. 1983).[5] Thus, it is sufficient here with

[5] This is also the logical implication of having a separate best mode requirement under § 112 which contemplates that the specification can

respect to enablement that the patents disclose at least one attachment means which would enable a person of ordinary skill in the art to make and use the claimed inventions. Because the patents disclose the alternatives of moly-manganese brazing and pulse-soldering, their failure to also disclose Coherent's TiCuSil braze cycle is not fatal to enablement under § 112.

Spectra argues that the patents' references to the "moly-manganese process" is only in regard to low-temperature pulse-soldering, not brazing. We disagree. A fair reading of that paragraph as part of the general discussion of brazinng given that moly-manganese brazing was the most common method of bonding metal to ceramic, is that one skilled in the art would recognize that moly-manganese brazing was an alternative means of attatchment. Spectra's Dave Wright, among others, testified that moly-manganese brazing was common in the industry and was well-known for brazing copper to ceramic.

The district court ignored the moly-manganese process, however, for the erroneous reason that it was "neither described nor advocated in the patents in suit." A patent need not teach, and preferably omits, what is well known in the art. *Hybritech,* 802 F.2d at 1384, 231 USPQ at 94. While there is no elaboration of moly-manganese brazing in the patent specifications, the district court found that brazing was an old and well-known technique when the applications were filed.

Spectra argues that moly-manganese brazing suitable for use in constructing the lasers of the two patents was not enabled because it required undue experimentation as evidenced by the amount of time and money it spent developing its moly-manganese process. Spectra's efforts, however, were not simply directed to finding a moly-manganese process that would work, but encompassed a whole range of enterprises necessary to making a commercially successful product. In fact, it took only three months from the time Spectra decided on a specific design for its laser until it established a workable braze technique, but it was almost another year before it made its first truly successful prototype laser.

---

enable one to make and use the invention and still not disclose a single preferred embodiment.

The two major problems that Spectra claims it had to solve in order to have a successful moly-manganese process also do not show lack of enablement. For example, Spectra contends that the moly-manganese process requires the use of precision ceramic tubing, something not taught in the patent. But Steve Jarrett, charged with developing Spectra's braze process, stated that the reason he used precision tubing was to save labor costs. Likewise, Spectra claims that Dr. Reed had to develop a special computerized striping tool to grind away circular rings from the coat of moly-manganese metallization painted on the inside of the tube. A Spectra in-house report reveals, however, that stripe metallized tubes were available from the same vendors that made the ceramic tubes themselves.

As for the court's statement that moly-manganese was not "advocated" in the patents, this is another matter entirely. We can only surmise that the court somehow confused the enablement requirement with the best mode.[6] Nonenablement is the failure to disclose *any* mode, *In re Glass*, 492 F.2d 1228, 1233, 181 USPQ 31, 35 (CCPA 1974), and does not depend on the applicant advocating a particular embodiment or method for making the invention. In practical terms, where only an alternative embodiment is enabled, the disclosure of the best mode may be inadequate. But that is a question separate and distinct from the question whether the specification enabled one to make the invention at all. *In re Gay*, 309 F.2d at 772, 135 USPQ at 315.

Finally, there is no mention at all of low-temperature pulse-soldering, except to the extent that the court considered it to be the same as the "moly-manganese process." Spectra asserts that pulse-soldering could not be used in the method claimed in the Mefferd patent because it permits soldering of only one cup at a

---

[6] One indication that the district court probably confused the concepts of enablement and best mode is the cases cited by the court in its conclusions on enablement, *Dale Electronics Inc. v. RCL Electronics, Inc.*, 488 F.2d 382, 180 USPQ 225 (1st Cir. 1973) and *Union Carbide Corp. v. Borg Warner Corp.*, 550 F.2d 355, 193 USPQ 1 (6th Cir. 1977), which deal primarily with best mode, not enablement, under § 112.

time. This may be true, but it says nothing about making the structure claimed in the Hobart patent. At the very least, the court should have considered whether it was an operative alternative for making the Hobart structure.

3. Best Mode

a. The Jury Question (Again)

Coherent raises the same question with respect to best mode that we found unnecessary to decide for enablement, that is, whether the jury implicitly found that the patents disclosed the best mode. Because the district court also found for Coherent on best mode, it would seem unnecessary to decide the jury question in this context as well. It is relevant, however, as far as it affects the proper standard of review in this court and so we must address it.

The parties clearly intended the jury to decide best mode. The interrogatories submitted to the jury, however, failed to carry out that intent. Interrogatory 14 read as follows:

> 14. Did Coherent disclose the best mode known to it at the time the patent application was filed?
>
> Yes _____ No _____

The question came back unanswered because the preamble to the question instructed the jury to consider best mode only if it had answered the preceding interrogatory on obviousness "no." The jury answered that question "yes"—but only for certain claims. The preamble to interrogatory 14 should have instructed the jury to answer best mode if the answer to obviousness was "no" or "yes as to less than all claims."

This is the type of inadvertent omission that Rule 49(a), Fed. R. Civ. P., remedies by providing that trial by jury has been effectively waived in these circumstances. *See Quaker City Gear Works, Inc. v. Skil Corp.*, 747 F.2d 1446, 1453, 223 USPQ 1161, 1165 (Fed. Cir. 1984), *cert. denied*, 471 U.S. 1136 (1985) (right to trial by jury of factual issue may be waived by agreeing to instructions that jury need not answer all questions); *see also* 5A

Moore's Federal Practice ¶ 49.03[4] (1986). Coherent's failure to object to the form of the interrogatories caused the best mode issue, by operation of Rule 49(a), to revert to the court for decision. *See Quaker City*, 747 F.2d at 1453, 223 USPQ at 1166. Thus, we review the district court's findings on best mode under the "clearly erroneous" standard of Rule 52(a), Fed. R. Civ. P., and not, as Coherent's argument suggests, as if the lower court's ruling was a denial of a motion for JNOV under Rule 50(b).

The single instruction to the jury that invalid claims cannot be infringed (a nonsense statement), one of many on supposed general principles of patent law, does not operate to convert the interrogatories on infringement into general verdicts which subsumed all of Spectra's invalidity defenses, including best mode. Any inference that the jury *implicitly* found that the best mode requirement was satisfied is negated by the preamble to interrogatory 14 which in effect told the jury that it need not consider the best mode.

b. Adequate Disclosure of Best Mode

Because the best mode provision of § 112 speaks in terms of the best mode "contemplated by the inventor," there is no objective standard by which to judge the adequacy of a best mode disclosure. *DeGeorge v. Bernier*, 768 F.2d 1318, 1324, 226 USPQ 758, 763 (Fed. Cir. 1985). Instead, only evidence of "concealment," whether accidental or intentional, is considered. *Id.* The specificity of disclosure required to comply with the best mode requirement must be determined by the knowledge of facts within the possession of the inventor at the time of filing the application. *See United States Dep't of Energy v. Daugherty*, 687 F.2d 438, 446, 215 USPQ 4, 11 (CCPA 1982).

Compliance with the best mode requirement, because it depends on the applicant's state of mind, is a question of fact subject to the clearly erroneous standard of review. *See McGill, Inc. v. John Zink Co.*, 736 F.2d 666, 676, 221 USPQ 944, 951 (Fed. Cir.), *cert. denied*, 469 U.S. 1037 (1984). This assumes, however, a proper legal understanding of the best mode requirement, which we find missing from the district court's analysis. In general, we do not disagree with the facts as found by the district court. It is

only the court's ultimate conclusion that the best mode requirement was satisfied that we reject.

In analyzing compliance with the best mode requirement, the district court focused only on the generic rather than the specific information known to the inventors and found that neither Mefferd nor Hobart intentionally, deliberately, or accidentally "concealed the braze technique as the best mode of attaching the heat web to the alumina tube." (Findings of Fact 4 and 8.) The patent specifications make clear, however, that the best mode contemplated by the inventors, as least as far as the critical "means for attaching" the copper cups to the ceramic tube is concerned, was more than just brazing in general—it was TiCuSil active metal brazing. Coherent acknowledges as much by its references to TiCuSil as the "preferred" brazing material and by the fact that Coherent never used anything else.

The appropriate question then is not whether the inventors disclosed TiCuSil brazing *at all*—they did—but whether TiCuSil brazing was *adequately* disclosed. *See In re Sherwood*, 613 F.2d 809, 816, 204 USPQ 537, 544 (CCPA 1980), *cert. denied*, 450 U.S. 994 (1981). Even though there may be a general reference to the best mode, the quality of the disclosure may be so poor as to effectively result in concealment. *Id.*

The facts found by the district court, when placed in the proper framework, plainly demonstrate that the TiCuSil brazing technique used by Coherent was not adequately disclosed. The court stated in findings of fact under the heading "ENABLEMENT":

> 2. The use to which Coherent put the TiCuSil braze material was, and was known to be by Coherent at the time, contrary to criteria for the use of TiCuSil as contained in the literature.

and again,

> 9. The reference to brazing as used in the patents and the extraneous texts (Kohl, Wesgo Brochure) relied upon by Coherent, do not describe for the benefit of one skilled in the art of laser construction the manner in which the Mefferd

> method is usable for the construction of the Hobart apparatus by means of [TiCuSil] brazing.

The district court also found that the inventors were aware of the problems associated with TiCuSil:

> 4. The known difficulty recognized by Hobart and Mefferd in working with TiCuSil as a braze material for the purpose to which they put it is reflected in Hobart's disclosure dated March 1, 1979 . . . that the titanium-copper-silver process is "not preferred as compared with what is called the moly-manganese technique which produces stronger and also less leak-prone seals" and essentially the same language in the May, 1979 patent disclosure signed by all of Hobart, Mefferd and Johnston.

Coherent admits that its braze cycle is not disclosed in either patent nor is it contained in the prior art. Instead, it maintains that its braze cycle is unique to its ovens, and because the performance of industrial ovens varies considerably, the actual parameters would be meaningless to someone who used a different oven. In support of its postition, Coherent cites *In re Gay*, 309 F.2d at 769, 135 USPQ at 316, which states that "[n]ot every last detail is to be described, else patent specifications would turn into production specifications, which they were never meant to be." In doing so, however, Coherent was not discussing whether it had complied with the best mode requirement because the court had held in its favor on that issue; it was discussing whether it had complied with the enablement requirement on which the court had held against it.

First, it is not up to the courts to decide *how* an inventor should disclose the best mode, but *whether* he has done so adequately under the statute. *Weil v. Fritz*, 601 F.2d 551, 555, 202 USPQ 447, 450 (CCPA 1979). Second, far from being a "production specification," Coherent did not disclose *any* details about its brazing process. It is this complete lack of detail which effectively resulted in its concealment.

Where the district court went wrong on the law while reaching the right result is starkly revealed in its conclusions of law. Under the heading of "BEST MODE" is this conclusion:

> 4. There was no concealment deliberate or otherwise by Hobart or Mefferd of the brazing process as the best mode of bonding the heating web to the alumina tube.

As we have pointed out, however, this refers to brazing in general, not the actual brazing cycle with TiCuSil and all of the parameters which Coherent found to be its best mode, admittedly not disclosed. In contrast, but under the heading "ENABLEMENT," is the key conclusion of law which supports our conclusion and the judgment, reading as follows:

> 3. The six stage braze cycle employed by Coherent, and developed by it, are [sic, is] necessary to the enjoyment of the invention taught by the patents in suit by a person skilled in the art of laser construction, and are [sic] not *sufficiently disclosed* by the patents in suit. [Original emphasis.]

For reasons above explained, Coherent's failure to disclose its "six-stage braze cycle" fully supports the defense of non-compliance with the best mode requirement of the first paragraph of § 112 although the inventions as broadly claimed could be practiced without knowledge of it, which means that the patent specifications are enabling. The trial court evidently had a grasp on the essential facts but somehow got them into the wrong legal pigeonholes. With the aid of lawyers, this is not difficult to do.

Spectra's claim in this declaratory judgment complaint that the two patents in suit are invalid must therefore be sustained on the ground that they fail to disclose the best mode contemplated by the inventors for practicing their respective inventions. 35 USC 112 and 282.

4. Attorney Fees

The primary basis for Spectra's request for attorney fees is Coherent's supposedly bad faith conduct during litigation, specifically the manipulation and suppression of evidence. While bad faith conduct during litigation may make a case exceptional under 35 USC 285, *see, e.g., Standard Oil Co.* v. *American Cyanamid Co.*, 774 F.2d 448, 455, 227 USPQ 293, 298 (Fed. Cir. 1985), judgments of a district court concerning good and bad faith are

not easily overturned, *Western Marine Electronics* v. *Furuno Elec. Co.*, 764 F.2d 840, 847 226 USPQ 334, 339 (Fed. Cir. 1985).

Spectra lists alleged abuses by Coherent, all presented to the court below and found unconvincing. Spectra has not shown that the court's implicit determination that this was not an exceptional case was erroneous or that the court based its discretion by denying Spectra its attorney fees. *See Reactive Metals Alloys Corp.* v. *ESM, Inc.*, 769 F.2d 1578, 1582-83, 226 USPQ 821, 824 (Fed. Cir. 1985). Furthermore, we see no need to remand as in *S.C. Johnson & Sons, Inc. v. Carter-Wallace, Inc.*, 781 F.2d 198, 201, 228 USPQ 367, 369 (Fed. Cir. 1986), where the court's reasons can be readily inferred from the record and arguments made below.

5. Other Issues

Because we affirm the judgment that the Hobart and Mefferd patents are invalid, we need not decide the other issues presented by Coherent's appeal and Spectra's cross-appeal, namely, those relating to the jury instruction on obviousness, inventorship of the shield claims, and derivatgion from Wright and Riley.

CONCLUSION

The judgment of the district court that the Hobart and Mefferd patents are both invalid is affirmed but on a different ground than that relied on by the court below. We hold that both patents are invalid under § 112, first paragraph, for failure to disclose the best mode, not for lack of enablement as the district court held.

The district court's denial of Spectra's request for attorney fees is affirmed.

AFFIRMED

United States Court of Appeals
for the Federal Circuit

Appeal Nos. 86-1114
and 86-1133

Spectra-Physics, Inc.,
Appellee/Cross-Appellant,

v.

Coherent, Inc.,
Appellant/Cross-Appellee.

Archer, *Circuit Judge*, concurring.

I join the opinion of the majority, except that I find no basis for the majority's comment regarding the "aid of [the] lawyers." The record on appeal does not indicate that the lawyers misled the court or otherwise affirmatively contributed to the court's error regarding enablement and best mode which, whether or not intended, seemes to be the implication of the comment.

United States Court of Appeals
for the Federal Circuit

Appeal Nos. 86 1114,
and 86-1133.

Spectra-Physics, Inc.,
Appellee/Cross-Appellant,

v.

Coherent, Inc.,
Appellant/Cross-Appellee.

Judgment

On Appeal from the United States District Court for the Northern District of California in Case No(s). C-83-20421-WAI

This Cause having been heard and considered, it is Ordered and Adjudged: AFFIRMED

DATED August 17, 1987

Entered by Order of the
Court

FRANCIS X. GINDHART
Francis X. Gindhart, Clerk

Attest: September 8, 1987

BETTY A. McKENNA
Deputy Clerk

Appendix B

In the United States District Court
for the Northern District of California

No. C-83-20421-WAI

FINDINGS OF FACT AND
CONCLUSIONS OF LAW

[Filed Aug. 27, 1985]

Spectra-Physics, Inc., a corporation,
Plaintiff,

vs.

Coherent, Inc., a corporation,
Defendant.

Certain issues having been submitted to the court for decision, and the court having considered the materials submitted by counsel and the oral argument of counsel conducted on July 19 and August 27, 1985, and good cause appearing therefor, the court now renders its FINDINGS OF FACT.

I.

CO-INVENTORSHIP-REMPEL

1. The patents in suit relate to a conductively cooled segmented bore ion laser employing an internal gas return path, and to a method of constructing such a laser.

2. Claims 2, 5 and 18 of the '600 patent and claim 10 of the '428 patent concern a cyclindrical ring gas barrier, or "shield member."

3. The function of the shield member as claimed in the '600 patent is to diminish end-to-end pressure differential within a segmented bore ion laser.

4. At the trial of the above-entitled action, the jury concluded that the concept of the shield member was suggested to Dr. Hobart by another.

5. Dr. Rober Remple testified that he suggested to Dr. Hobart a possible solution to the gas imbalance problem, a "snout" to prevent ions from going out between the discs. Rempel and Hobart has approximately six discussions of the problem in the fall of 1979.

6. Rempel suggested the use of a shield member. He played no part in building and/or testing a laser with a shield incorporated in it.

7. Rempel played no part in the design, supervision, construction or testing of the shield in Coherent Development Tube No. 2, which was the first Coherent tube to incorporate the shield member.

8. Coherent in an Answer to Written Interrogatory No. 3 placed the date of conception of the shield member at least as early as September, 1979.

9. Dr. Hobart consulted with Rempel, concerning pressure differentials on Innova Tube No. 1.

II.

ENABLEMENT AND BEST MODE

BEST MODE

1. Brazing was an old and well known technique at the time of the filing of the applications for the patent in suit.

2. The Mefferd '328 patent discloses brazing as the best mode for connecting the heat web to the alumina tube. Col. 5 LL. 60-64; Col. 5 L. 65—Col. 6 L. 6; Col. 6 L. 3; Col. 6 L. 34; Col 6 L. 41; Col. 6 LL. 53, 55, 59, 60, 67; Col. 7 LL. 5, 8, 24, 25, 37, 39.

3. The Mefferd '328 patent claims a method of: "permanently securing the heat conducting members to the electrically-insulating tube". Col. 8 LL. 51, 52.

4. The evidence does not preponderate in favor of the contention that Mefferd intentionally or accidentally concealed the braze technique as the best mode of attaching the heat web to the alumina tube.

5. The Hobart '600 patent in its summary describes a permanent metallic contact between "the inner cup and the outer ceramic wall" be means of "brazing or soldering". Col. 3 LL. 23-27.

6. The Hobart '600 patent refers to alternatives of brazing or soldering for effecting the permanent metallic contact at Col. 3 LL. 50, 51; Fig. 4; Fig. 10; Col. 6 LL. 25-35; 45, 62; Col. 74 LL. 8, 12, 15, 19, 27, 37, 52, 53,57.

7. The Hobart '600 patent claims inter alia, "(m)eans for attaching the distal edge of each of the cup rims along the inside wall of each tube." Col. 9 LL. 17-19; and "13 a laser as in claim 1 wherein said cup attaching means comprises brazing." Col. 10 LL. 11, 12; and "16 . . . (m)eans for attaching the outer circumference of each thin-walled member along the inside wall of said tube." Col. 10 LL. 29-31.

8. The evidence does not preponderate in favor of the contention that Hobart deliberately or accidentally concealed the braze technique as the best mode of attaching the heat web to the alumina tube.

ENABLEMENT

1. The Kohl text is cited as a recognized and authoritative work on brazing techniques; it does not reveal the braze cycle described in Exhibit 4005.

2. The use to which Coherent put the TiCuSil braze material was, and was known to be by Coherent at the time, contrary to the criteria for the use of TiCuSil as contained in the literature. (Tr. 3044A).

3. A person of ordinary skill in the art of laser design and manufacture would not derive from the patents in suit sufficient brazing information to enable the manufacture of the laser, without the same brazing problems encountered by Coherent and by Wright and Riley. (Tr. 2604, 2605).

4. The known difficulty recognized by Hobart and Mefferd in working with TiCuSil as a braze material for the purpose to which they put it is reflected in Hobart's disclosure dated March 1, 1979

(Exhibit 6161, page 5), that the titanium-copper-silver process is "not in high favor in the ceramic industry" and "not preferred as compared with what is called the moly-manganese technique which produces stronger and also less leak-prone seals" and essentially the same language in the May, 1979 patent disclosure signed by all of Hobart, Mefferd and Johnston. (Exhibits 7002, page 5.)

5. Mefferd (Tr. 3092) and Johnston (Tr. 3916, 3918, 3918A and 3919) testified that the braze cycle used by Coherent is not disclosed in either patent in suit and Mefferd testified that the braze cycle used by Coherent is different from that recommended to Coherent in December, 1980 by Wesgo. (Tr. 3093).

6. No Wesgo publication in evidence demonstrates the availability to those skilled in the art of laser design and manufacture the public availability of the braze cycle and process used by Coherent in the development of its Innova laser.

7. No authoritative text or Wesgo publication is referred to with respect to brazing by either of the patents in suit.

8. The references to brazing as used in the patents (see enumeration in Best Mode section) do not reveal the braze cycle utilized to accomplish the bond described in the patents.

9. The reference to brazing as used in the patents and the extraneous texts (Kohl, Wesgo Brochure) relied upon by Coherent, do not describe for the benefit of one skilled in the art of laser construction the manner in which the Mefferd method is usable for the construction of the Hobart apparatus by means of brazing.

10. The means of utilizing the moly-manganese process are neither described nor advocated in the patents in suits.

III.

UNCLEAN HANDS AND INEQUITABLE CONDUCT

1. Coherent cited to the Patent Office the most relevant prior art of which it was aware. The Myers Patent No. 3,501,714, (Exhibit JM-1), was cited by Coherent to the Patent Office, and was described in detail in both the Hobart and Mefferd patents.

(Column 1, lines 16 through column 2, line 49 of both the Hobart and Mefferd patents).

2. The Hughes Report lasers are no more relevant to the patents in suit than are the Coherent graphite lasers, as described in the earlier Mefferd patent which was before the Patent Office.

3. The Hughes Report co-authored by Dr. Thomas Johnston (Exhibit 5041) was no more relevant than the earlier Mefferd patent, Exhibit No. AD-1, cited to the Patent Office. Both disclose the utilization of a tensioned mandrel to align bore-defining elements. Neither disclose the "floating bore" concept of the Mefferd patent. (Johnston tr. at page 2076, line 1 through page 2077, line 13).

4. The jury found that Wright and Riley did not reduce their cold disc laser to practice. (Interrogatory No. 1). This precludes the work of Wright and Riley as prior art under 35 U.S.C. 102(g).

5. The jury also determined that the subject matter of the Hobart and Mefferd claims was not derived or obtained from direct or indirect knowledge of the work of Wright and Riley. (Interrogatory No. 6). This precludes the work of Wright and Riley as prior art under 35 U.S.C. 102(f).

6. Finally, the jury found that the work of Wright and Riley was not generally known or accessible. (Interrogatory No. 10). This precludes the work of Wright and Riley as prior art under 35 U.S.C. 102(a).

7. Since the jury's express findings preclude the work of Wright and Riley as prior art, Coherent cannot be guilty of any kind of inequitable conduct for failure to disclose the work of Wright and Riley to the Patent Office.

8. Spectra-Physics has not proven, by clear and convincing evidence, that Coherent has acted with unclean hands.

9. Since Dr. Hobart is properly the sole inventor of the shield invention, Coherent's conduct in filing and prosecuting the Hobart patent with Dr. Hobart as the sole inventor, was proper.

10. Since Dr. Rempel's contribution, if any, to the shield invention was to make a "suggestion", Coherent had no obligation to disclose this to the Patent Office or to include Dr. Rempel as a co-inventor.

11. Coherent had no motivation to fail to disclose Dr. Rempel as a co-inventor, if he was in fact a co-inventor.

12. There was no testimony by Dr. Rempel or anyone that Dr. Rempel even claimed to be an inventor of the shield, prior to his testimony at trial.

13. Whether Rempel made a suggestion to Hobart to use a shield has no bearing at all on the issue of validity of the Mefferd patent, which the jury found to be infringed.

IV.

INJUNCTIVE RELIEF

1. Coherent introduced to the market its patented Innova laser in 1981.

2. The jury found that the Spectra-Physics 2020 laser infringes claims 2, 5 and 18 of the Coherent '600 patent and claim 10 of the Coherent '328 patent.

3. Spectra-Physics first introduced its infringing Model 2020 in the fall of 1983 and has been manufacturing and selling the product since that time.

4. Only Coherent and Spectra-Physics utilize Coherent's patented technology.

5. Spectra-Physics' continued sale of its infringing Model 2020 laser will deprive Coherent of its exclusive right to manufacture and sell its patented laser, and will deprive Coherent of market advantage.

Having found the foregoing facts, the court concludes:

I.

CO-INVENTORSHIP-REMPEL

1. There is a presumption that the inventors named in an issued patent are correct, and the presumption can be overcome by clear and convincing evidence. *Jamesbury Corporation v. United States*, 518 F.2d 1384 (Ct.Cl. 1975).

2. To invalidate the '600 patent by proving improper inventorship it must be established by clear and convincing evidence that Rempel and not Hobart invented the shield member claimed in the '600 patent. *Acme Highway Products Corp.v. D.S. Brown Co.*, 431 F.2d 1074 (6th Cir. 1970).

3. Rempel rendered partial aid to Hobart by conveying an "intellectual notion" that the addition of a shield element might be of practical utility. That does not amount to the conception of an invention. *Polve v. UHL*, 328 F.2d 893 (C.C.P.A. 1964); *Standard Cartridge Co. v. Peters Cartridge Co.*, 77 F. 630 (6th Cir. 1896); *Land v. Dreyer*, 155 F.2d 383.

4. *Jamesbury Corporation v. United States, supra*, is not strongly in point because there the presumptions favored co-inventorship and the evidence was found insufficient to overcome it.

5. There is an absence of clear and convincing evidence sufficient to overcome the presumption that the inventors are correctly named.

6. Rempel is not co-inventor of claims 2, 5 and 18 of the '600 patent or of claim 10 of the '328 patent.

II.

ENABLEMENT AND BEST MODE

BEST MODE

1. Although the concepts of best mode and enablement are distinct, the question posed in the best mode defense is: Did the patentee deliberately conceal something? *U.S. Department of Energy v. Daugherty*, 687 F.2d 438 (CCPA 1982).

2. Concealment need not be deliberate. *Coal Processing Equipment, Inc. v. Campbell*, 578 F. Supp. 445 (S.D. Ohio WP 1981).

3. An inventor is in compliance with the requirements of 350 U.S.C. § 112 (last clause of paragraph 1) if he does not conceal what he feels is a preferred embodiment of his invention. The question of whether or not the best mode is disclosed by the inventor is separate and distinct from the question of whether his disclosure is sufficient to satisfy the requirements of the balance of the first paragraph of 35 U.S.C. § 112. *Application of Gay*, 390 F.2d 769 (CCPA 1962)

4. There was no concealment deliberate or otherwise by Hobart or Mefferd of the brazing processes the best mode of bonding the heating web to the alumina tube.

ENABLEMENT

1. In *Dale Electronics Inc. v. RCL Electronics, Inc.*, 488 F.2d 382 (1st Cir. 1973) the court said:

> "We do not accept the proposition that where an inventor, as here, clearly knows a specific material that will make possible the successful reproduction of the effects claimed by his patent, but does not disclose it, . . . he may nevertheless be considered as having described the best mode contemplated by him . . . "

2. Omission of what is known to be necessary to the enjoyment of an invention need not be deliberate in the sense that it rises to the level of active concealment or inequitable conduct in order to warrant invalidation of the patent. *Union Carbide Corp. v. Borg Warner Corp.*, 550 F.2d 355 (6th Cir. 1977).

3. The six stage braze cycle employed by Coherent, and developed by it, are necessary to the enjoyment of the invention taught by the patents in suit by a person skilled in the art of laser construction, and are not *sufficiently disclosed* by the patents in suit.

4. The Hobart and Mefferd patents in suit do not set forth an enabling disclosure as required by 35 U.S.C. § 112 and are invalid for that reason.

III.

UNCLEAN HANDS AND INEQUITABLE CONDUCT

1. This court may not conclude that either of the Coherent patents was procured by fraud since Spectra-Physics did not prove by clear, unequivocal and convincing evidence that Coherent made deliberate misrepresentations to the Patent Office during the prosecution of either patent. *Scott Paper Company v. Fort Howard Paper Company*, 432 F.2d 1198, 1204 (7th Cir. 1970), *cert. denied*, 401 U.S. 913 (1971).

2. Since the Patent Office had the best prior art before it at the time it examined the Hobart and Mefferd patents, there can be no inequitable conduct on the part of Coherent in not disclosing any art. *Kimberly-Clark v. Johnson & Johnson*, 745 F.2d 1437, 1457 (Fed. Cir. 1984).

3. Since the jury returned a verdict that Spectra-Physics was infringing and had been infringing certain of the claims of the Hobart and Mefferd patents, the jury concluded that the claims were valid and that Coherent was not guilty of unclean hands in obtaining the claims, since the jury had been previously instructed by the court that invalid claims may not be infringed. *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, Appeal Nos. 84-853 and 84-883 slip.op. at 8 (Fed. Cir. March 29, 1985); *Railroad Dynamics Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1516 (Fed. Cir. 1984), *cert. denied*, ____ U.S. ____, 105 S.Ct. 220, 83 L.Ed. 150 (1984); *McGill, Inc. v. John Zink Co.*, 736 F.2d 666, 672, (Fed. Cir. 1984).

4. Dr. Rempel was not a co-inventor and Coherent was under no duty to disclose him as such to the Patent Office.

5. Coherent was not obligated to disclose to the Patent Office the work of Wright and Riley.

6. Coherent was not obligated to disclose the Hughes reports to the Patent Office.

7. There was no deliberate or intentional failure to disclose the best mode or an enabling disclosure.

8. There was no mischaracterization of the Myers and Rigden patent sufficient to constitute inequitable conduct or unclean hands.

IV.

INJUNCTIVE RELIEF

1. Where validity and continuing infringement have been established, immediate irreparable injury is presumed for the purpose of preliminary injunctive relief, *Smith International Inc. v. Hughes Tool Co.*, 718 F.2d 1573 (Fed. Cir. 1983).

2. Once the patentee's rights have been held to be valid and infringed, the patentee should be entitled to the full enjoyment and protection of patent rights. *Smith International, Inc. v. Hughes Tool Co., supra.*

3. The financial responsibility or ability of Spectra-Physics to compensate Coherent for infringement is not to be considered in determining the irreparable harm which will result to Coherent if a preliminary injunction does not issue. *Smith International, Inc. v. Hughes Tool Co., supra.*

4. The public interest will not be adversely affected by the grant of injunctive relief.

Dated: 8-28-85

WILLIAM A. INGRAM
William A. Ingram
United States District Judge

Appendix C

In the United States District Court
for the Northern District of Calif.

No. C-83-20421-WAI

Memorandum of Decision

[Filed Dec. 16, 1985]

Spectra-Physics, Inc.,
a corporation,
Plaintiff and Counterdefendant,

v.

Coherent, Inc., a corporation,
Defendant and Counterclaimant,

Coherent, Inc., moves for reconsideration of the Findings of Fact and Conclusions of Law filed herein on August 28, 1985. The motion was argued on October 23, 1985, and duly submitted. After consideration of the argument of counsel and of the memoranda filed in support of and in opposition to the motion the court now DENIES the motion, and adheres to the Findings of Fact and Conclusions of Law heretofore filed.

Coherent, Inc., urges in support of its motion many of the same contentions which it relied upon in the hearings preceding the filing of Findings of Fact and Conclusions of Law. It now argues at greater length then previously its contention that a finding of enablement must be subsumed from the jury's findings of infringement of Hobart claims 2, 5, 7 and 8 and Mefferd claim 10. It is contended that the court's findings on the issue of enablement improperly invade the jury's prerogative. *Railroad Dynamics, Inc. v. A. Stucki Company*, 727 F.2d 1506 (CA Fed. Cir. 1984) does not support an argument that an inappropriate "role reversal" occurred in the instant case. Unlike *Stucki*, the jury in the instant case was not asked to find a specific verdict on each of the defenses proferred by Spectra Physics. The issue of enablement, agreed by both parties to be one of law, was properly reserved to the court in the circumstances of this case. It is apparent from the briefing of the parties, called to the attention of

the court by Spectra-Physics, that until this issue of reconsideration the parties regarded the form of verdict submitted to the jury as a special verdict under Fed. R. Civ. P. 49(a), and not as a general verdict.

The following issues urged by Coherent were considered by the court at the time it formulated its Findings of Fact and Conclusion of Law, and on this motion for reconsideration nothing of substance has been added by the parties, and the motion essentially amounts to arguing the same issues twice.

1. Disclosure and enablement requirement of 35 U.S.C. § 112.

2. Necessity of disclosure of braze cycle.

3. Information, such as texts, readily available to one skilled in the art, need not be disclosed in a patent.

4. Literature, combined with the teachings of the patents in suit, enable one skilled in the art to practice the inventions of the patents in suit.

5. Sufficient of description of moly-manganese as an alternative braze technique.

DATED: 12/12/85

WILLIAM A. INGRAM
United States District Judge

Appendix D

In the United States District Court

for the Northern District of California

No. C-83-20421-WAI

FINAL JUDGMENT

(Proposed by Spectra-Physics)

Spectra-Physics, Inc., a corporation,
Plaintiff and Counterdefendant

vs.

Coherent, Inc., a corporation,
Defendant and Counterclaimant.

[Filed Dec. 16, 1985]

The above-entitled action having been tried before a jury, and the Court having ruled on the issue of enabling disclosure, and good cause appearing therefore, IT IS ORDERED ADJUDGED AND DECREED as follows:

1. The Hobart 4,378,600 and Mefferd 4,376,328 patents in suit do not set forth an enabling disclosure as required by 35 U.S.C. 112 and are invalid for that reason in their entirety.

2. In the year 1978 and prior thereto, the apparatus contained in claim 1, 8, 9, 10, 11, 12, 13, 14, 16, 17, and 19 of the Hobart patent was obvious to a person ordinarily skilled in the gas ion laser art, and those claims are invalid under 35 U.S.C. 103.

3. In the year 1978 and prior thereto, the method contained in claims 1, 2, 3, 4, 5, 6, 7, 8, 12, 13 and 14 of the Mefferd patent was obvious to one having ordinary skill in the ion laser art and those claims are therefore invalid under 35 U.S.C. 103.

4. Prior to submission to the jury, directed verdicts of non-infringement were granted as to claims 3, 6, 7, and 15 of the Hobart 600 patent and claims 9 and 11 of the Mefferd '328 patent.

5. That plaintiff and cross-defendant Spectra-Physics, Inc. shall have and recover its costs of suit actually incurred.

DATED: 12-10-85

WILLIAM A. INGRAM
William A. Ingram

Appendix E

FILED

MAR 8 - 1985

WILLIAM L. WHITTAKER
CLERK, U.S. DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

Spectra-Physics, Inc., a corporation, Plaintiff and Counterdefendant, v. Coherent, Inc., a corporation, Defendant and Counterclaimant.	NO. C-83-20421-WAI INTERROGATORIES TO THE JURY

1. Did Wright and Riley reduce their cold disc laser to practice before any conception of the subject matter set forth in the Hobart and Mefferd patents?

Yes _____ No X

If your answer to question 1 is yes, answer questions 2, 3, 4 and 5.

2. Was the cold disc laser work done by Wright and Riley at Spectra-Physics in 1977-1978 intentionally abandoned?

Yes _____ No _____

3. Was the cold disc laser work done by Wright and Riley at Spectra-Physics in 1977-1978 intentionally suppressed?

Yes _____ No _____

4. Was the cold disc work done by Wright and Riley in 1977-1978 intentionally concealed?

Yes _____ No _____

If your answer to either or any of questions 2, 3 or 4 is yes, or your answer to question 1 is no, answer question 5, or if your answer to question 1 is yes, but you find that less than all of the subject matter of Hobart and Mefferd was so reduced to practice then answer question 5 as to those claims not so found to be reduced to practice.

5. Do you find by clear and convincing evidence that the work of Wright and Riley at Spectra-Physics in 1977-1978 was disclosed to Hobart and Mefferd directly or indirectly and known by them?

Yes ✓ No _____

6. If your answer to the foregoing question is yes, was the subject matter of the Hobart claims, or of the Mefferd claims, or any of them derived or obtained from such direct or indirect knowledge of the work of Wright and Riley at Spectra-Physics in 1977-1978?

Yes _____ No ✓

7. If your answer to question 6 is yes, please enumerate the claims of Hobart and/or the claims of Mefferd so derived?

Hobart _____

_____

_____

Mefferd _____

_____

_____

If your answers to either question 1 or to question 5 or to question 6 is no, or if your answer to question 7 is that less than all of the Hobart claims and/or the Mefferd claims were so derived, please answer questions 8, 9 and 10.

8. Do you find that a person of ordinary skill in the art of designing, developing and manufacturing lasers prior to 1978 was a person possessing a Ph.D or other advanced degree in Physics or Electrical Engineering and having substantial knowledge and/or experience in the manufacture and design of lasers?

Yes X No _____

9. Do you find that a person of ordinary skill in the art of designing, developing and manufacturing lasers prior to 1978 was a person possessing substantial knowledge and/or experience in plasma physics, the design and manufacture of discharge tubes, vacuum tubes, arc lamps and travelling wave tubes?

Yes _____ No X

10. Was the work of Wright and Riley done at Spectra-Physics in 1977-1978 prior art generally known or accessible to those skilled in the ion laser art?

Yes _____ No X

If your answers to questions 8, 9 or 10 is yes, answer question 11.

11. Do you find by clear and convincing evidence that the work of Wright and Riley at Spectra-Physics in 1977-1978 anticipates the claims of Hobart and/or the Mefferd claims?

Yes X No _____

If so, which claims are so anticipated?

Hobart all except 2 4 5 18

Mefferd all except 10

If your answer to question 11 is no, or the answer is yes, but for less than all claims which remain, answer question 12.

12. Do you find by clear and convincing evidence, that the work of Wright and Riley at Spectra-Physics in 1977-1978 renders obvious the Hobart claims and/or the Mefferd claims, or any of them?

Yes / No _____

If the answer to question 12 is yes, please enumerate the claims so found to be obvious.

Hobart 1, 8, 9, 10, 11, 12, 13, 14, 16, 17, 19

Mefferd 2 3 4 5, 6 7, 8

If your answer to questions 8, 9 or 10 is no or your answers to question 11 and question 12 are no, or the answer to question 11 or 12 is yes, but for less than all the claims which remain, please answer the following questions:

13. Do you find by clear and convincing evidence, considering the Hobart patent as a whole, and the Mefferd patent as a whole, that the claims of either of them were obvious giving consideration to the prior art, the level of ordinary skill in the art, and the differences between the claims of the Hobart and/or Mefferd patents and the prior art?

Yes ✓ No _____

If your answer is yes, please enumerate the claims found to be obvious.

Hobart 1,8,9,10,11 12, 13, 14, 16, 17, 19

Mefferd 1, 2, 3 4, 5, 6, 7, 8, 11, 12, 13, 14

If your answer to question 13 is no, please answer question 14.

14. Did Coherent disclose the best mode known to it at the time the patent application was filed?

Yes _____ No _____

15. Did Hobart include a cylindrical shield in a laser tube as the result of the suggestion of another?

Yes ✓ No _____

16. Do you find by clear and convincing evidence that claims 1, 2, 3, 8-15, 16 and 19 of Hobart are directed to an unworkable laser?

Yes _____ No ✓

17. Is any claim of the Hobart patent infringed by the Spectra-Physics 2020 laser?

Yes ✓ No _____

If yes, which claims are so infringed?

Hobart 2, 5, 7, 18

18. Is any claim of the Mefferd patent infringed by the process used to make the Spectra-Physics laser tube?

Yes ✓ No _____

If yes, which claims are so infringed?

10

DATED: August 10, 1982

FOREMAN